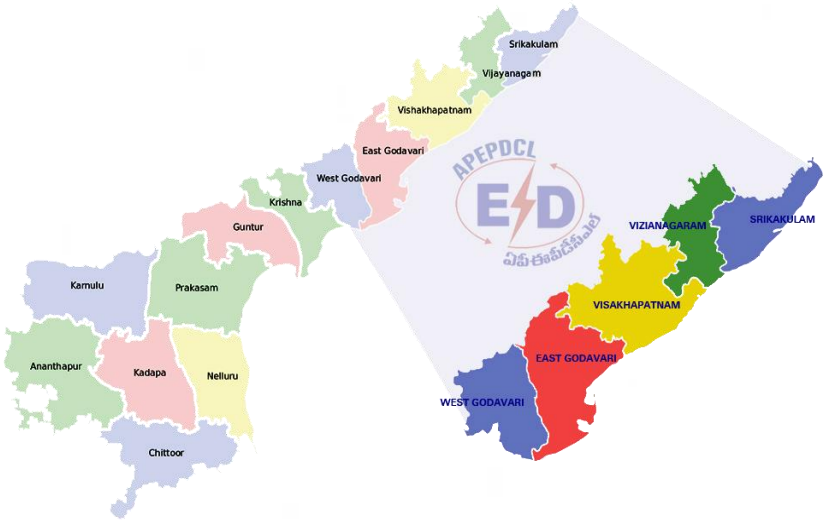
Eastern Power
Distribution Company of A.P. Ltd
ఆంధ్ర ప్రదేశ్ తూర్పు ప్రాంత విద్యుత్ పంపిణీ సంస్థ



Business Plan for 4th Control Period (FY2019-20 to FY2023-24)

December 2018

Contents

1 Business Plan for APEPDCL for the 4th Control Period

The Andhra Pradesh Electricity Regulatory Commission (APERC), Regulation 10 of 2013 directs the licensees to submit a Business Plan for Hon'ble Commission's approval. The Business Plan shall contain the following:

- Year Wise Load Growth
- Year Wise Distribution Loss Reduction with Specific Action Plan
- Metering Plan for Metering Interface Points
- Treatment of Previous Losses
- Cost Reduction Plan
- Other important Financial analysis or parameters

The Guidelines as per Regulation 39 of Regulation 10 of 2013 state that the distribution licensee shall submit a Business Plan for such period as the Commission may direct and shall update plan annually.

The licensee herewith submits the Business Plan for FY 2018-19 to FY 2023-24 for the review and approval of the Hon'ble Commission.

The Business Plan as submitted by the Licensee consists of the following sections

- Year Wise Load Growth
- Year Wise Distribution Loss Reduction with Specific Action Plan
- Metering Plan for Metering Interface Points
- Other important Financial analysis or parameters

2 Context of the Business Plan

The business plan for the distribution licensee is based on the resource plan filed by the licensee on 31st July 2018 for 4th and 5th Control period and Multi-year tariff petition filed by the licensee for 4th Control Period. The summary of the Load Forecast Plan and Power Procurement Plan is given below.

2.1 Load Forecast Plan Summary

2.1.1 Historical Sales Summary

The table below captures the 5-year historical sales as presented in Discom Resource Plan:

Category	FY13	FY14	FY15	FY16	FY17	FY18	CAGR
LT Category							
LT-I Domestic	3,207	3,435	3,709	4,420	4,607	5,031	9.4%
LT-II Non-domestic/Commercial	636	647	685	831	898	979	9.0%
LT-III Industrial	435	495	622	770	891	1,283	24.2%
LT-IV Cottage Industries	2.9	1.8	1.9	2.2	2.1	2.3	0.0%
LT-V Agriculture	1,528	1,752	2,167	2,149	2,399	2,188	7.4%
LT-VI Street Lighting & PWS	268	236	224	232	214	226	0.0%
LT-VII General Purpose	36	37	39	47	49	54	8.6%
LT-VIII Temporary Supply	1.22	0.68	0.50	1.72	0.45	0.64	0.0%
LT Total	**6,115**	**6,605**	**7,448**	**8,454**	**9,062**	**9,764**	**9.8%**
HT Category							
HT-I Industry	2,683	2,688	3,244	3,916	3,866	4,032	8.5%
HT-I (B) Ferro-Alloys	1,194	1,372	1,307	856	1,417	2,467	15.6%
HT-II Others (Commercial)	446	496	517	644	564	591	5.8%
HT-III Public Infrastructure and Tourism	1	14	14	14	41	42	137.5%
HT - IV Agriculture	56	60	103	108	261	411	49.2%
HT-V Railway Traction	565	620	628	652	634	674	3.6%
HT-VI Townships and Residential Colonies	29	28	28	32	32	31	1.3%
HT-VII Green Power	0.00	0.00	0.00	0.00	0.00	0.00	0.0%
HT-VII RESCOs	212	235	229	294	290	331	9.3%
HT-VIII Temporary Supply	0.00	0.00	0.00	0.00	5.28	8.20	0.0%
HT Total	**5,185**	**5,514**	**6,069**	**6,516**	**7,112**	**8,587**	**10.6%**
LT+HT Total	**11,300**	**12,119**	**13,517**	**14,969**	**16,174**	**18,351**	**10.2%**

2.1.2 Sales Forecast

2.1.2.1 Category wise sales projection

The table below summarizes the category-wise sales projections for the period FY 2018-19 to FY 2023-24:

Consumer Category	FY18 (Actual)	FY19	FY20	FY21	FY22	FY23	FY24	CAGR
LT Category								
LT-I Domestic	5,031	5,316	5,671	6,590	7,212	7,894	8,640	9.4%
LT-II Non-domestic/Commercial	979	1,040	1,124	1,288	1,432	1,594	1,780	10.5%
LT-III Industrial	1,283	1,562	1,817	1,921	2,199	2,520	2,888	14.5%
LT-IV Cottage Industries	2.3	3	3	2.42	2.44	2.47	2.49	1.0%
LT-V Agriculture	2,188	2,078	2,281	2,353	2,436	2,522	2,610	3.0%
LT-VI Street Lighting & PWS	226	231	237	240	245	250	255	2.0%
LT-VII General Purpose	54	65	70	66	71	76	82	7.2%
LT-VIII Temporary Supply	0.64	0.8	0.8	0.68	0.69	0.71	0.72	2.0%
LT Total	**9,764**	**10,515**	**11,437**	**12,461**	**13,598**	**14,858**	**16,258**	**8.9%**
HT Category								
HT-I Industry	4,032	4224	4449	4,761	5,040	5,339	5,661	5.8%
HT-I (B) Ferro-Alloys	2,467	2824	3293	3,397	3,782	4,211	4,691	11.3%
HT-II Others (Commercial)	591	655	682	669	705	743	783	4.8%
HT-III Public Infrastructure and Tourism	42	38	39	49	52	55	58	5.3%
HT - IV Agriculture	411	478	1,391	1,430	1,472	1,517	1,562	24.9%
HT-V Railway Traction	674	691	711	715	729	744	759	2.0%
HT-VI Townships and Residential Colonies	31	26	27	33	34	35	36	2.6%
HT-VII Green Power	0	0	0	0	0	0	0	0.0%
HT-VII RESCOs	331	342	363	440	484	533	586	10.0%
HT-VIII Temporary Supply	8.20	11	11	8.5	8.6	8.7	8.8	1.1%
HT Total	**8,587**	**9,290**	**10,966**	**11,502**	**12,307**	**13,185**	**14,144**	**8.7%**
LT+HT Total	**18,351**	**19,586**	**22,168**	**23,963**	**25,905**	**28,043**	**30,402**	**8.8%**

**Sales for FY19 and FY 20 has been taken as per revised estimates as per ARR filing for FY2019-20. For Remaining years, sales estimates has been taken as per Resource Plan filed for 4th and 5th Control Period.*

2.2 Loss Trajectory Summary

The licensee has taken various steps to reduce the losses like strengthening of the network infrastructure, addition of network elements, and vigorously undertaking the Energy Audit visit to keep a close tab on the losses.

The actual losses for the period for FY 2012-13 to FY 2017-18 when compared with APERC target is summarized below.

Voltage Level	FY2012-13		FY 2013-14		FY 2014-15		FY 2015-16		FY 2016-17		FY 2017-18	
	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual	Approved	Actual
LT	5.13%	5.93%	5.00%	6.93%	5.00%	5.38%	5.00%	4.41%	4.70%	2.45%	4.74%	4.27%
11 KV	4.27%	4.55%	4.20%	4.15%	4.20%	2.14%	4.00%	4.00%	3.80%	3.35%	3.80%	3.42%
33 KV	3.47%	4.26%	3.40%	3.41%	3.40%	5.30%	3.40%	2.12%	3.20%	2.73%	3.22%	2.90%

Based on the historical performance and the loss reduction measures carried out in the state, the licensee projects the loss for the period FY 2018-19 to FY 2023-24 as below:

APEPDCL	FY 2018-19*	FY 2019-20	FY 2020-21	FY 2021-22	FY 2022-23	FY 2023-24
Annual LT Loss %	4.16%	4.13%	4.11%	4.08%	4.05%	4.02%
Annual 11 kV Loss %	3.33%	3.28%	3.25%	3.20%	3.15%	3.10%
Annual 33 kV Loss %	2.82%	2.81%	2.80%	2.79%	2.78%	2.77%

**Distribution loss in % as approved by the commission in Retail Tariff Order of FY 2018-19*

2.2.1 Energy Requirement (MU)

The methodology followed upon for determination of Energy Input at Discom/State level is described below:

a) Based on sales forecast and open access sales projected by the Licensee, the energy input at the Discom periphery has been determined by undertaking following steps:
   - Energy Input at LT level = LT sales + LT losses
   - Energy Input at 11 kV level = Energy Input at LT level + 11KV sales+11 kV losses
   - Energy Input at 33 kV level = Energy Input at 11 kV level +33kv Sales+ 33 kV losses
   - The total energy requirement from various schemes (solar rooftop scheme, solar pumpset scheme, Electric Vehicles, etc.) mentioned in section 3.2 of Resource Plan

for the 4th control period i.e. (FY 2019-24) at 33 kV level and Energy input from Open access sales at 33 kV level has been separately calculated and added to the Discom level Energy input at 33 kV level.

b) Total Energy Input at Discom periphery = Energy Input at 33 kV level + 132 kV Sales +132 kV Open Access sales.

c) The Energy Input at State level has been determined by combining the Energy Input of both the Discoms and grossing up that energy with Transmission losses and PGCIL losses.

Based on the category wise sales forecast and loss trajectory, below is the energy requirement:

Parameters	FY18 (Actual)	FY19	FY20	FY21	FY22	FY23	FY24
Annual LT Loss %	4.27%	4.16%	4.13%	4.11%	4.08%	4.05%	4.02%
Energy Input at LT level (MU)	10,215	10,748	11,685	12,979	14,139	15,419	16,832
Annual 11 kV Loss %	3.42%	3.33%	3.28%	3.25%	3.20%	3.15%	3.10%
Energy Input at 11kV level (MU)	12,832	13,490	14,574	16,026	17,359	18,825	20,438
Annual 33 kV Loss %	2.90%	2.82%	2.81%	2.80%	2.79%	2.78%	2.77%
Energy Input at 33 kV level (MU)	15,063	15,925	17,194	20,039	21,634	23,429	25,368
Total Energy Input at 33 KV + 132 kV Sales (MU)	**19,678**	**20,936**	**23,612**	**26,443**	**28,576**	**30,968**	**33,565**

2.2.2 Load Forecast (MW)

Licensee determined the load factors based on following method (Reference to Section 4.3 in Resource Plan):

- State/Discom /Circle level demands have been undertaken for each hour during FY 2017-18. On the basis of this hourly demand monthly average for each hour and yearly average demand have been determined.
- State/Discom/Circle level peak demands for each month and year have also been undertaken for FY 2017-18.
- The Load factor is determined using below formula:

  Load Factor = Yearly average demand / Yearly peak demand

On the basis of Energy Input at 33 kV level for Discom and Circle and assumed load factors for FY2017-18, licensee projected demand in MW for 4th and 5th control period as per formula mentioned below (Reference to Section 4.4 in Resource Plan):

Peak Demand (MW) = Energy required / (24*365/1000)/ load factor

The peak load forecasted at state level has been shown below:

Parameters	FY18 (Actuals)	FY19	FY20	FY21	FY22	FY23	FY24	CAGR
Energy Req. at State level (MUs)	56,209	63,448	67,713	73,212	79,146	85,776	93,106	**8.8%**
State Peak Demand (MW)	8,983	10,532	11,450	12,219	13,209	14,315	15,539	**9.6%**

On the basis of non-coincident load factors and energy input at 33 kV level each Discom & Circle level, mentioned above, non-coincident peak demands at Discom level & at Circle level have also been estimated. Summary of the peak demands at APEPDCL is shown below:

Circle/Peaks at 33 kV level	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Srikakulam	180	200	218	238	261	285	312
Vizianagaram	224	251	273	298	326	356	390
Visakhapatnam	617	696	749	807	870	938	1,013
Rajahmundry	690	739	800	868	943	1,027	1,119
Eluru	830	918	1,122	1,198	1,283	1,383	1,488
EPDCL	**2,222**	**2,434**	**2,742**	**2,956**	**3,191**	**3,456**	**3,742**

2.3 Power Procurement Plan Summary

- Based on existing and future planned installed capacities, energy availability in MUs has been determined for each power station, based on formula shown below:

  *Energy generation in MUs = Plant capacity (MW) * AP Share (%) * (1- Auxiliary power consumption in %) * Plant load factor (%) *24*365/1000*

  where Plant load factor is mentioned in section 5.1

The table below summarizes projected energy Availability:

Sources (all figures in MUs)	FY 18 (Actual)	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24
APGENCO Thermal	26,646	24,295	24,018	35,544	32,568	30,050	30,050
APGENCO Hydel	2,392	2,920	3,150	2,477	2,591	3,370	4,051
CGS	19,480	14,992	16,064	19,845	19,845	19,845	19,845
APGPCL/DISCOM Gas	5,195	3,704	3,231	5,195	5,195	5,195	5,195
IPPs - Others	315	9,222	5,352	1,816	1,745	1,709	1,709

Sources (all figures in MUs)	FY 18 (Actual)	FY 19	FY 20	FY 21	FY 22	FY 23	FY 24
NCE - Solar	2,998	4,571	7,202	10,130	10,130	10,130	10,130
NCE - Wind Power	7,282	7,682	8,866	9,245	9,237	9,115	8,987
NCE - Mini Hydel	97	115	111	127	158	147	139
NCE -Others	458	304	590	823	732	642	552
Energy Availability	**64,863**	**67,805**	**68,584**	**85,203**	**82,200**	**80,204**	**80,658**

The total MU demand is the total Energy Input at state level for power procurement determined in section 2.2.1 above.

Based on the energy generation and energy input for power procurement the table below summarises Energy (MUs) balance at state level:

	FY 19	FY20	FY21	FY22	FY23	FY24
State Energy Availability	67,805	68,584	85,203	82,200	80,204	80,658
State Energy input*	63,448	67,713	71,355	76,951	83,152	90,033
State Energy Surplus/ (Deficit)	**4,357**	**870**	**13,847**	**5,248**	**(2,949)**	**(9,375)**

- Based on the MW requirement at each hour and MW availability available at each from various sources, licensee also observed the demand-supply scenario on 24*365 time blocks. On the basis of deficit scenario identified, Licensee has estimated yearly average of hourly maximum deficit, hourly minimum deficit and hourly average deficit. However, the Licensee has considered yearly average of maximum deficit for determining capacity to be procured.
- The capacity procured for meeting such annual average hourly maximum deficit is sufficient to meet 90% of demand. However, Licensee has extrapolated such capacity to be procured so that it is able to meet 95% of demand. Remaining 5% has been estimated to be procured from power exchange on short term basis.
- Licensee expects to meet the capacity to be procured through Round the Clock (RTC) power with a PLF from 60% to 80% considering following factors:
    - 70% of the requirement shall be met through plants having PLF or CUF of 70% or 80%
    - 30% of the requirement shall be met through plants having PLF or CUF of 40% or 60.

- Licensee also expects to procure Spinning Reserve for unit with highest capacity available or 5% of installed capacity whichever is lower. Licensee has considered 800 MW to be procured in FY 2019-20.
- Projected capacity requirements in MW have been shown below:

Power Procurement (MW)	FY19	FY20	FY21	FY22	FY23	FY24
Annual Avg Maximum Deficit (Based on hourly demand-supply situation) *	-	815	415	1,565	2,574	3,483
Annual Avg Minimum Deficit (Based on hourly demand-supply situation)	-	-	-	-	158	738
Annual Average Deficit (Based on hourly demand-supply situation)	-	-	-	381	1,310	2,075
Estimated PP Capacity to be procured for meeting demand 95% of the time		1,500	800	2,500	4,000	5,400
Estimated PP Capacity to be procured for meeting demand 95% of the time -YoY	-	1,500	-	1,000	1,500	1,400
Spinning Reserve for estimated PP capacity	-	879**	-	53	79	74
Estimated PP Capacity to be procured for meeting demand 95% of the time -YoY	-	**2,379**	-	**1,053**	**1,579**	**1,474**
RTC Power to be procured (70% of Total PP Capacity with availability @ 80%)	-	1,665	-	737	1,105	1,032
RTC Power to be procured (30% of Total PP Capacity with availability @ 60%)	-	714	-	316	474	442
Short Term Purchase (Meeting 5% of hourly avg demand)	**475**	**400**	**519**	**393**	**438**	**464**
Estimated PP Capacity to be procured for meeting 100% hourly average demand	**475**	**2,779**	**519**	**1,446**	**2,017**	**1,938**

* - Procurement to meet this deficit will cater 90% of the hourly avg demand

** - Spinning Reserve (Highest Unit Capacity or 5% of Installed Capacity whichever is lower) for 800 MW considered

2.4 Investment Plan Summary

Below table shows the historical capital expenditure which has been undertaken by the Licensee in last 5 years i.e. FY 2013-14 to FY 2017-18 which has been met by the Licensee through its own funds:

Sr. No.	Item	FY14	FY15	FY16	FY17	FY18
1	**Substations (New & Augmentation)**	40	47	77	27	26
2	**Metering & Associated equipment**	10	26	62	64	71
3	**Distribution Transformer Additions**	12	25	26	11	16
4	**Lines, Cables & Network**	168	169	213	221	303
5	**Loss reduction measures**	40	53	71	45	64
6	**Technology Upgradation and R&M**	0	1	1	1	0

Sr. No.	Item	FY14	FY15	FY16	FY17	FY18
7	**Civil works and Others**	8	9	49	102	97
	Total	**278**	**331**	**498**	**471**	**577**

In addition to the capital investment shown above, the Licensee has also undertaken investments under various ongoing schemes such as IPDS, DDUGJY, APDRP, HVDS project, World Bank and other grants, as shown below:

Sr. No.	Item	FY14	FY15	FY16	FY17	FY18	FY19	FY20	FY21	FY22	FY23	FY24
1	Substations (New & Augmentation)	-	-	1	28	106	149	62	-	-	-	-
2	Metering & Associated equipment	-	-	-	-	-	60	65	40	-	-	-
3	Distribution Transformer Additions	-	-	-	10	32	45	30	-	-	-	-
4	Lines, Cables & Network	8	13	56	96	107	102	29	0.75	0.75	0.75	0.75
5	Loss reduction measures	32	34	27	41	132	185	246	-	-	-	-
6	Technology Upgradation and R&M	-	-	-	32	33	69	39	-	-	-	-
Total (Rs. Cr.)		**40**	**47**	**84**	**206**	**411**	**609**	**471**	**41**	**0.75**	**0.75**	**0.75**

It is evident from the above table, that capital investment from ongoing schemes for network strengthening, loss reduction, improving quality and reliability such as IPDS, DDUGJY, HVDS, etc. shall reduce substantially in 4th and 5th control periods.

The table below provides the projected Capital Expenditure of APEPDCL from FY 2018-19 to FY 2023-24 under DISCOM spend:

Sr. No.	Item	FY19	FY20	FY21	FY22	FY23	FY24
1	**Substations (New & Augmentation)**	231	226	283	332	390	446
2	**Metering & Associated equipment**	50	65	80	95	110	125
3	**Distribution Transformer Additions**	165	239	173	200	236	269
4	**Lines, Cables & Network**	253	249	275	319	375	431
5	**Technology Upgradation and R&M**	75	88	101	114	127	140
6	**Civil works and Others**	30	34	38	42	46	50
Total (Rs. Cr.)*		**804**	**901**	**950**	**1,102**	**1,285**	**1,461**

The table below provides the projected Capital Expenditure of APEPDCL from FY 2018-19 to FY 2023-24 including ongoing schemes.

Particulars	FY19	FY20	FY21	FY22	FY23	FY24
Capital Expenditure Projected (Rs. Crore)	1,414	1,372	991	1,103	1,286	1,462

The rationale for the Capital Expenditure projections is provided in the subsequent sections.

3 Metering plan for Metering Interface Points

The distribution licensee has achieved 100% metering of feeders and consumers (excluding agricultural consumers) in its license area. Further, the licensee has metered around 1,17,450 (52.45%) out of 2,23,928 agricultural Consumers (AGL SCs) in its license area as on October 2018.

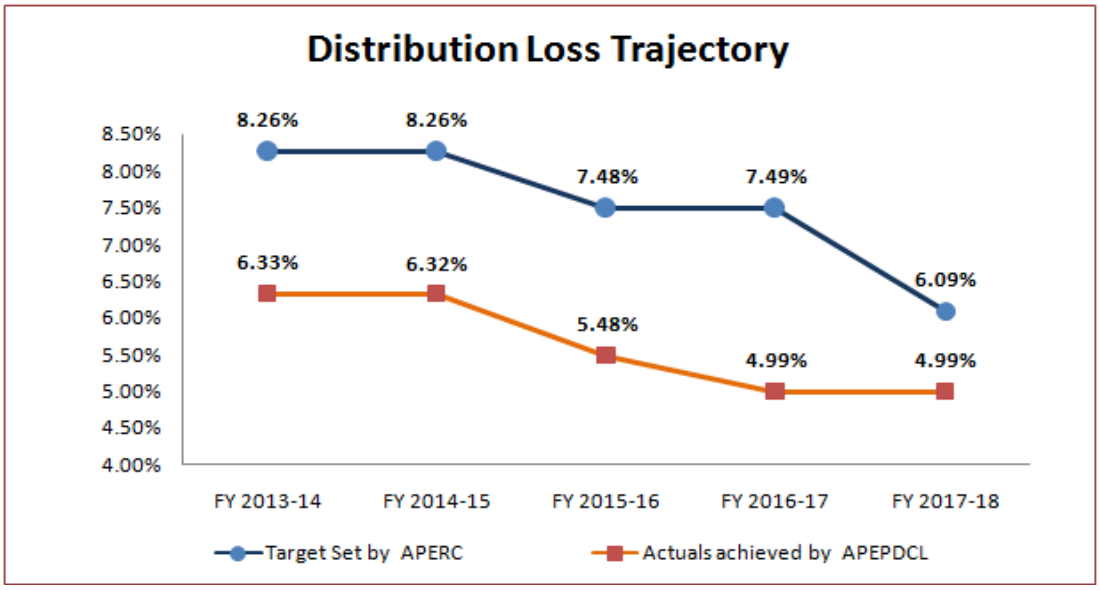
4 Treatment of previous losses

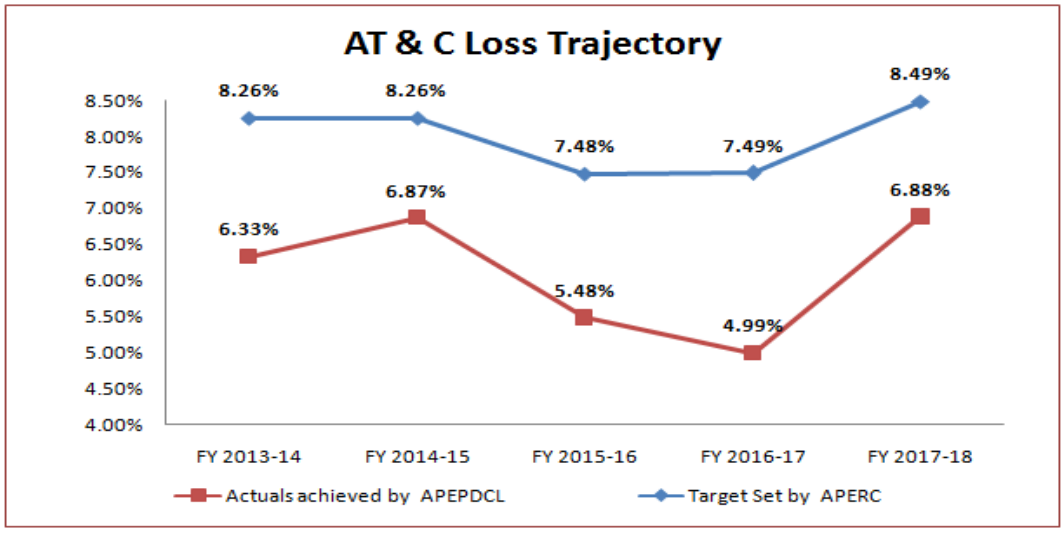
As per the prevailing regulations, i.e., Regulation 4 of 2005 and Regulation 1 of 2014, certain items such as variation in sales and sales mix, variation in agricultural sales, variation in revenue from tariff and variation in non-tariff income which are not in the control of the licensees are treated as controllable items, which leads to losses that cannot be trued-up. In order to avoid further accumulation of losses, APDISCOMs have submitted a letter vide reference no. Lr No. CGM/Opn/SPDCL/TPT/RAC/F.Regn.4/D.No.12/16 dt. 15.01.2017 to the Commission to suitably amend the current regulations.

5 Performance of APEPDCL as Distribution Licensee over the past 3 years

5.1 Improved the Operational Performance by reducing the Distribution Loss of previous years

The distribution loss has been decreasing steadily over the years. The reduction in AT&C losses, increasing collection efficiency and the Distribution loss trajectory have been highlighted in the figure below.





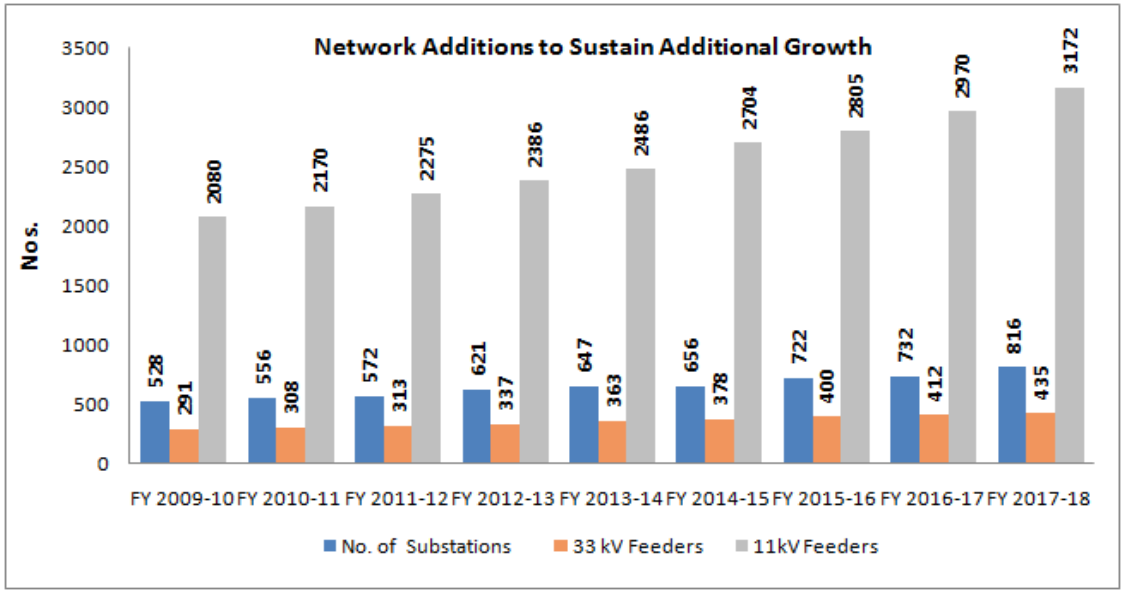
- The above graphs indicate considerable reduction in distribution loss whereas there is increasing AT&C losses because of declined collection efficiency. The major contribution for decrease in collection efficiency is large accumulation of arrears from Govt. services particularly from Panchayat Raj and Lift Irrigation schemes.

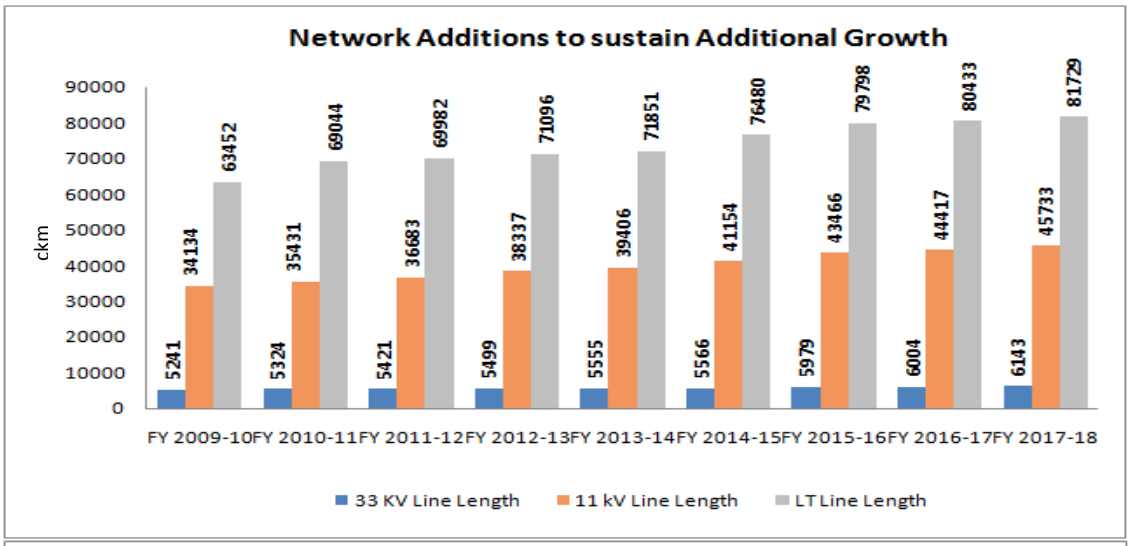
The following initiatives have been taken to reduce distribution losses in APEPDCL:

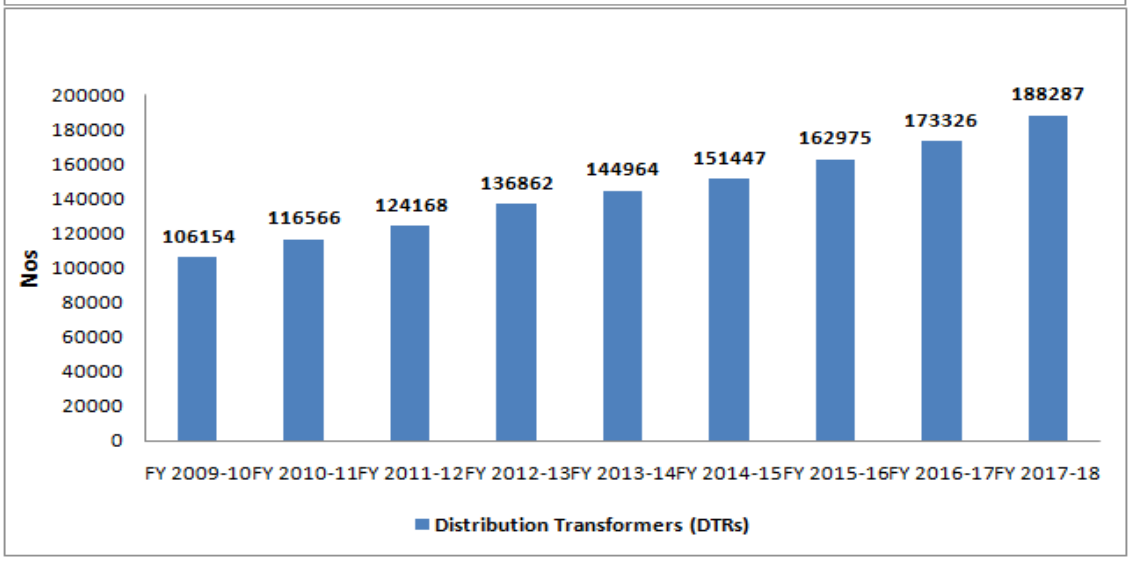
- Augmentation of conductor / PTR / DTR capacity
- Bifurcation of feeders
- Interlinking lines
- Erection of new substations
- Erection of additional DTRs
- Erection of capacitor banks
- Metering :
  - 100% metering (excluding agriculture)
  - Meters provided to all street lights and water works services
  - 47,47,553 Nos. IRDA port meters are provided in place of existing electro mechanical meters.
- Introduction of monthly billing system to all the services
- Continuous monitoring of top ten high loss towns and mandal headquarters and preparing action plan to bring down AT&C losses to permissible limits.

5.2 Network Additions to sustain Load growth

The licensee have significantly added Substations, DTR's and Lines (33kV, 11kV and LT) to meet the growing demand.



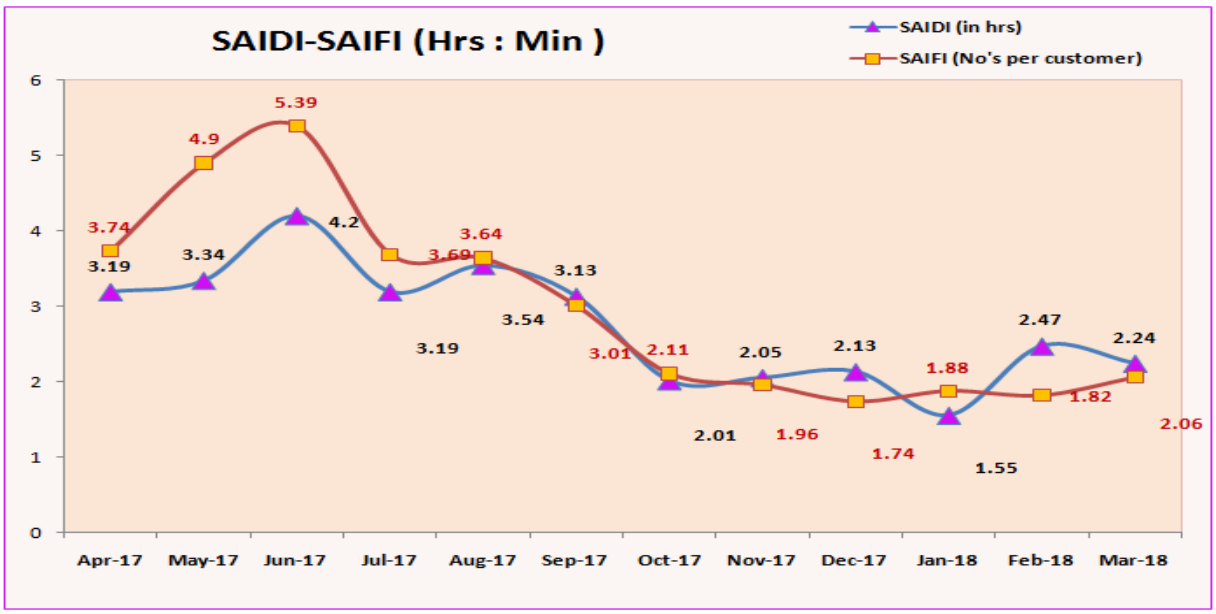




5.3 Focus to improve reliability of power supply

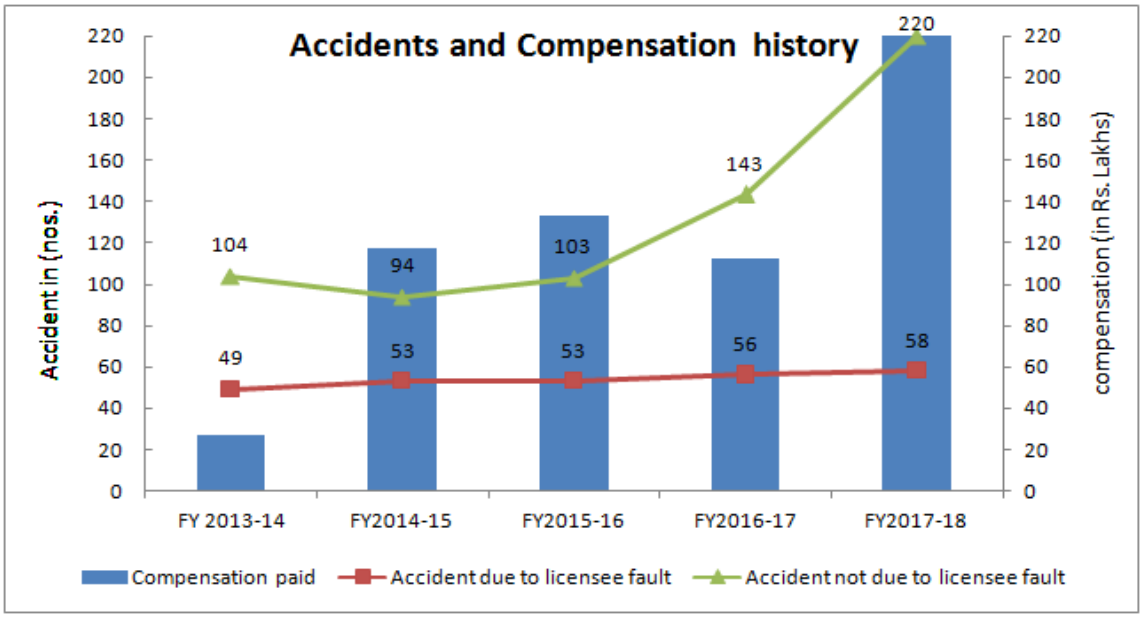
The licensee has taken many measures to improve the reliability of power supply. There has been significant reduction in the SAIDI / SAIFI indices over the past 12 months. The SAIDI / SAIFI trajectory have been highlighted in the table below:

Particulars	Unit	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Nov-17	Dec-17	Jan-18	Feb-18	Mar-18
SAIDI	hh:mm	3.19	3.34	4.2	3.19	3.54	3.13	2.01	2.05	2.13	1.55	2.47	2.24
SAIFI	No	3.74	4.9	5.39	3.69	3.64	3.01	2.11	1.96	1.74	1.88	1.82	2.06



5.4 Measures undertaken to increase safety and reduce accidents

- Identified and rectified loose lines by erecting intermittent / strut poles
- Brought awareness among the public to maintain standard clearances whenever they construct buildings
- Brought awareness to the public to be more careful during natural calamities
- Awareness to the department staff to strictly follow the safety rules and safety procedures
- Recruitment of staff to avoid public intervention with electrical lines / DTRs
- Regular maintenance of lines and equipment including pre-monsoon inspection



5.5 Energy Conservation measures taken up by APEPDCL

- APEPDCL comprises of 5 districts namely Srikakulam, Vizianagaram, Visakhapatnam, East Godavari and West Godavari with approximately 58 Lakhs consumers contributing an average grid demand of around 2400MW.
- As part of Energy Conservation week, APEPDCL organizes the following activities to create awareness on Energy Conservation, Energy Efficiency and Renewable Energy Sources i.e. Solar etc.,
    - Rallies are conducted for creating awareness among general public.
    - Painting Competitions are conducted for School going children in Sub Junior, Junior & Senior Categories on the Topic Energy Conservation & Solar Energy.
    - Technical quiz conducted for school going children to create awareness on Energy Resources and Energy Conservation.
    - Solar Expo conducted from 22nd to 24th August 2015 with Solar panel vendors and other energy efficient devices suppliers to promote Roof top solar Energy.
    - Workshops are conducted for creating awareness on Energy Conservation for farmers and to encourage farmers to utilise Energy Efficient pumpsets in place of their old pumpsets under AgDSM Programme.

5.5.1 Energy Conservation Initiatives taken by APEPDCL

- As part of Loss Reduction and Energy Conservation Measures the following initiatives are taken:

a. BEE 5 Star rated DTRs erected

- APEPDCL is the first power utility in procurement of DTRs with BEE 5 star rating among all power utilities in India. So far 87,402 Nos. BEE Star rated DTRs have been erected.

b. Capacitor Banks erected

- 119 No's of 1MVAR and 03 No's 2MVAR Capacitor Banks totalling to 125 MVAR were erected.
- 184 Nos. of 600 KVAR capacitor banks totalling 110.4 MVAR erected on 11 kV Agriculture feeders for improving power factor and consequent reduction of load current on the feeders.

c. Distribution of LED Bulbs to each domestic consumer

- APEPDCL implemented DSM Based Efficient Lighting Programme (DELP) through M/s. EESL for distribution of LED bulbs in APEPDCL area.

- 2 Nos. LED Bulbs of 7W/9W were distributed to each domestic service at free of cost and about 75.41 Lakh bulbs were distributed. Estimated Energy Savings per month is 46.47 MU.
- Supply of 2 more LEDs to BPL SC ST Consumers in addition to the two LED bulbs being supplied by the DISCOMs under SCSP and TSP funds. So far 10.94 Lakh bulbs were distributed to the consumers.
- Cumulative Energy savings per year for 86 Lakh LED bulbs distributed is 639.05 MU.

d. Gram Swaraj Abhiyan (GSA) :

- Govt. of India has launched Gram Swaraj Abhiyan Programme – Special initiative during 14th April to 5th May 2018 covering various activites in Unnat Jyoti by Affordable LED for All- Ujala.
- 9W LED bulbs were sold by EESL in 58 villages of Srikakulam, East Godavari and West Godavari Districts at Rs 50/- each during the programme.Under Extended GSA, EESL sold LED bulbs in entire Visakhapatnam & Vijayanagaram Districts and distributed 94663 LED bulbs.
- The GoAP has also initiated distribution of more LED bulbs across the counter to the desired consumers at bulk procurement price of Rs. 70/- per each bulb.

e. Implemented Domestic Efficient Fan Programme (DEFP) :

- APEPDCL implemented the Domestic Efficient Fan Programme (DEFP) in Narasapuram revenue division in West Godavari District through M/s. EESL for distribution of 1,00,000 Nos. of BEE 5 star rated fans on upfront basis @ Rs1100/- per fan and in Instalment basis @Rs.1250/- per fan with 24 instalments.
- APEPDCL filed a petition for extending the program in all areas of APEPDCL in similar method for distribution of 12 Lakh fans. The Hon'ble APERC accorded approval for implementation of the programme in APEPDCL area.
- So far 63,315 Nos. fans were distributed in both upfront and EMI option.
- The estimated energy savings per annum is 4.98 MU.

f. Tube lights :

- APEPDCL proposed to implement the Energy Efficient LED Tube Light (EETL) program with the financial support of M/s. Energy Efficiency Services Limited (EESL), New Delhi.

- Under this program LED Tube Lights will be issued to the willing consumers in UPFRONT counter mode. So far 76680 Nos Tube Lights have been distributed in 5 Districts. The estimated energy savings is 3.4 MU

g. Installed Ag DSM Project :

- APEPDCL has initiated implementation of Ag DSM based project at Rajanagaram Mandal in East Godavari District on ESCO model with M/s EESL.
- Under this project 2496 Nos inefficient agricultural Pump sets are proposed to be replaced with Energy Efficient Pump Sets (EEPS) .However 973 Nos old pump sets were replaced with Energy Efficient Pump Sets and the total Estimated Energy Savings per annum is about 15.76 MU.
- Further APEPDCL has initiated implementation of Ag DSM programme of replacement of **35,000 Nos old conventional Pump Sets with most Energy Efficient Pump Sets** in 5 districts of APEPDCL. Expected Energy savings to DISCOM per annum is 113.12 MU.
- **11161** Number of Energy Efficient Pump sets have been replaced in APEPDCL area as on 30.09.18 and the estimated energy savings are 21.22 MU.

Due to the above and various other activities the Energy loss of APEPDCL has got reduced to 5.48%. If it is further reduced by 1%, approx. 170MU of power can be saved annually cost of which is Rs 70/- Crores and hence loss reduction activities are being continuously monitored.

5.5.2 Solar Roof Top Project

- APEPDCL is encouraging the development of Renewable energy and accepting the Gross/Net Metering options from the eligible developers as per the Policy, 2015
- For promotion of Solar Roof Top Projects, APEPDCL has conducted many awareness programme with channel partners, public, Bankers, NREDCAP officials, Residential welfare associations. APEPDCL has conducted training programmes to its staff for promotion of Solar Roof Top and nominated district wise, division wise nodal officers.
- 10KW Roof top Solar Project were installed at ATC building Visakhapatnam during the year 2012 and 10KW Roof top Solar Project were installed at Govt Circuit House Visakhapatnam during the year 2015.
- Recently APEPDCL management has accorded approval to sanction loans to the employees of APEPDCL who wish to install Solar Rooftops up to a capacity of 3 KWp. The orders are yet to be issued.

- The Solar Rooftops are being installed on all office buildings of APEPDCL and collector offices covering all five districts of APEPDCL by adding a capacity of 1.28MW.
- During a recent meeting with MD/NREDCAP, Channel Partners of Solar Rooftop and Andhra Bank Officials, it was approved to install 1 KWp Solar Rooftop systems to the interested consumers of low income group by providing upfront subsidy and loan for the balance amount, in Visakhapatnam city in the first phase, and allowing the EMIs of the loan in the monthly CC bills of the consumer by entering MOU with Andhra Bank. Due to this innovative idea, nearly 600 Nos applications have been registered and 150 Nos applicaitons have already been processed by banks for loans. Synchronization has been completed for 200Nos. Solar Rooftops.
- So far 1204 Nos., Solar Rooftop Systems with 23732 KW capacity have been synchronized with the grid.

5.5.3 Solar Agriculture Pump sets

As a measure to reduce power purchase cost especially for Agriculture which is the highest loss potential pocket, 12406 Nos. solar Agriculture Pump sets were installed and about 154 No's works are in progress.

5.6 IT Initiatives

APEPDCL is exploring various modes to utilize technological developments for improving operational efficiency and customer care. Some of the highlights of the areas in which the basic work is completed and is expected to Go-Live by the end of this financial year are as follows:

Ease of Doing Business (EODB):

As per the Department of Industrial Policy and Promotion (DIPP), Government of India proposed Ease of Doing Reforms 2017. In turn, the Industries department, Government of A.P has communicated EoDB reforms frame work for implementation by the DISCOMs.

As per the EoDB frame work, the simplified templates are prepared duly reducing the number of documents required for obtaining the electricity connection to only two, namely proof of ownership / occupancy and authorization document (in case of firm / company) and the same is being implemented duly integrating the said templates at Mee seva portal, Industries Single desk portal and online application of APEPDCL website.
By implementing EoDB frame work, the applicants are provided fixed cost estimate based on the load (KVA/ KW) required for obtaining electricity connection in all areas. This

system allows submission of online application, System generated demand note, online payment and tracking of status without the need for a physical touch point for document submission for new electricity connection.

IAMR based HT Billing:

Billing of all HT services in the DISCOM through Integrated Automatic Meter Reading (IAMR) is taken up and up to 90% of the services are presently being billed with IAMR.

Mobile Applications:

Apart from existing mobile apps viz 'Eastern Power' & 'AP Vidyut Pravah' for consumers and D List operation & PMI for field employees, few more Mobile apps for field staff are developed for improving the internal efficiency of the DISCOM

- App for release of new service connections
- App for online updation of the complaints received from Command Control Centre (CCC)
- App for surveying all aqua culture services

Integrated Power Development Scheme (Phase-2):

A scheme was sanctioned by Govt. Of India for an amount of Rs. 3.82 Crores for the additional 8 Nos. towns under IPDS Phase-2. As part of this, Upgradation of Command Control Centre (CCC) with latest IVRS technology and Implementation of GIS & MDAS for the 8 towns are taken up.

Integrated Power Development Scheme (IT Enablement):

A scheme was sanctioned for an amount of Rs. 10.71 Crores for Up gradation of SAP ERP from ECC 6.0 to Suite On HANA under IPDS (IT Enablement). The scheme is under implementation stage.

EP Digital:

With digital being the new norm, Indian electric utilities are evolving rapidly to cater to changing consumer needs and behavior. Hence, with a vision to become a digital organization, APEPDCL has started its digital transformation journey under the flagship project "EP Digital". The objective of "EP Digital" is to improve customer experience across consumer categories for the organization.
As part of this project, APEPDCL has undertaken seven key digital initiatives:

1) A digitalized 'Smart Bill' – The consumer electricity bill at present has been completely digitalized to highlight important information on energy consumption and to provide personalized insights to consumers in a visually appealing format.
2) Proactive notification dispatch to consumers – Under this initiative, the DISCOM seeks to provide important notifications to its consumers via SMS, email and the Eastern Power mobile app. Notifications include – bill reminders, delayed payments, outages, status of new connection application, etc.
3) 2 Way Communication through SMS service - This self-care solution empowers consumers to communicate with the DISCOM via SMS to obtain important information across key areas such as outages, billing, complaints etc.
4) Advanced Interactive Voice Response System (IVRS) – In order to provide anytime anywhere customer service over the phone, APEPDCL is currently upgrading its IVRS application. The aim is to have the upgraded application act as a single interactive point for a variety of consumer services including supply and billing related complaint registration, reporting an emergency, obtaining outage related information, Mee seva & ATP location information etc.
5) APEPDCL Website redesign, and the creation of customer and business portals – With the goal of providing personalized information through an easy-to-use and interactive interface, the website has gone through a complete redesign to give it a modern look and feel. Additionally, portals for domestic as well as business users have been created to ensure easier access to information and services such as viewing of Smart Bills, making payments, analyzing consumption patterns, viewing outage alerts, etc. to all consumers.
6) Multi-Channel Consumer Survey – By conducting consumer surveys across multiple channels, APEPDCL is seeking to capture insights and pain points across areas such as bill generation, bill payments, new connection process, complaint resolution, etc. The feedback received will help the DISCOM improve customer experience.
7) Digital Marketing and social media campaigns – With a focus on leveraging social media for improving customer engagement, APEPDCL is actively engaging with its consumers on social media channels, such as Facebook and Twitter. The goal is to promote new products and services and to address consumers' grievances and suggestions

5.7 Focus on Industrial Consumers

In order to maintain growth rates in the HT category, certain action points were taken by the Licensee:

- Sustained initiatives by the GoAP to attract investments into the state
- Continue to provide separate feeders and monitor them regularly to minimize interruptions, thereby supplying quality power
- Real Time Feeder Monitoring System was launched

6 Performance Improvement Plan of APEPDCL for FY 2017-18 to FY 2023-24

6.1 Loss Reduction Initiatives

- In order to bring down Distribution losses to a sustainable level, Discoms planned to carry out the following initiatives :
    - Continue to invest in schemes which would bring down losses, especially schemes like HVDS, IPDS and System Improvement.
    - Voltage was improved by resorting to additional infrastructure like erection of new 33/11kV and EHT sub-stations and Power Transformer capacity augmentations.
    - Providing Star Rated DTRs to all new extension of networks.
    - Erection of Line Capacitor Banks and capacitor banks at 33/11KV sub stations to improve voltage profile and to reduce line copper losses.
    - Targeted **check readings** and **intensive inspections** by Operation and DPE (Detection of Pilferage of Energy) Wings, a separate vigilance wing headed by an IPS officer (JMD/Vigilance and Security) at Vidyut Soudha, Vijayawada.
    - Improve energy audit by the following:
        - Relieving of load on Overloaded feeders duly bifurcating the feeders/ Augmentation of the existing conductor.
        - Relieving of load on Overloaded DTRs duly erecting new DTRs/ Augmentation of the existing DTRs.
        - Recording accurate data for Transformers (33kV/11kV, DTR), HT and LT Lines (33kV, 11kV, LT), Consumer meters to obtain correct picture of losses.
        - Monitor and record this data on a regular basis and take corrective and preventive measures wherever possible.
        - Carry out sustained vigilance initiatives related to theft detection and Shortfalls duly utilizing tools such as CAT (Consumer Analysis Tool), and MATS (Monitoring and Tracking System) for realization of amounts.
        - Monitoring and reviewing the Online Energy Audit of all 11 KV feeders duly utilising the OMS Module.

Continue metering drive across the Discom by replacing defective meters and replacing the ordinary/High quality/High accuracy meters with IrDA Port meters for all consumers.

7 Key Financial Parameters

The key financial parameters of APEPDCL are detailed below.

7.1 Capital Expenditure

Capital expenditure (CAPEX) is defined as the expenditure incurred by DISCOM on but not limited to acquire or upgrade physical assets such as property, buildings or equipment. It may be noted that the scope of expenditure is limited to physical, immovable assets only.

For the period from FY 2018-19 to FY 2023-24, the licensee has estimated the capital expenditure as below.

Particulars	FY19	FY20	FY21	FY22	FY23	FY24
Capital Expenditure Projected (Rs. Crore)	1,414	1,372	991	1,103	1,286	1,462

7.2 Asset Base

Total capitalization for the Base Year and the Control Period has been projected based on the following assumptions:

1) Capitalization of Base Investment and Capital Work-in-Progress (CWIP): Capitalization of assets for MYT period has been considered based on historical actual capitalization trends and capital expenditure projected for the Control Period.
2) Capitalization of Expenses
   a) Interest during Construction (IDC): Interest during Construction (IDC) has been calculated as a percentage of the average Capital Works-in-Progress for the year.
   b) Operational and Maintenance (O&M) Expenses: Operational and Maintenance (O&M) Expenses capitalized has been projected at 11% of capital expenditure incurred for the year.

Thus, the licensee has projected capital investment undertaken and its capitalisation for the Base Year and Control Period as given below:

Closing Balance of CWIP = Opening Balance of CWIP + Capital Expenditure during the year + Expenses Capitalized – Investment Capitalized

Particulars	FY19 (RE)	FY20	FY21	FY22	FY23	FY24
Opening Balance of Capital Work in Progress (CWIP)	399	1,359	1,935	1,181	551	643
Capital Expenditure during the year	1,414	1,372	991	1,103	1,286	1,462

Expenses Capitalized	156	151	109	121	141	161
Interest During Construction	33	71	140	134	75	52
Total expenses capitalized	188	222	249	255	217	213
Transfer to fixed assets	641	1,018	1,993	1,988	1,411	1,587
Closing CWIP	**1,359**	**1,935**	**1,181**	**551**	**643**	**731**

7.3 Investment

For the period from FY2018-19 to FY2023-24, loan requirement is as follows:

Particulars (Rs. Cr)	FY19	FY20	FY21	FY22	FY23	FY24
Capital Expenditure	1,414	1,372	991	1,103	1,286	1,462
Grants	458	210	252	263	300	338
Loan Requirement	956	1,162	739	840	986	1,124
Ongoing Loans (Receipts)	179	0	0	0	0	0
New Loans Requirement (Receipts)	1,054*	1,162	739	840	986	1,124

**already planned loans*

7.4 O&M Expense

The Operation & Maintenance (O&M) Expenses consist of the following components:

a. Employee Expenses (EE) including Salaries, wages and other employee costs;
b. Administrative & General costs (A&G) including legal charges, audit fees, rent, rates and taxes;
c. Repairs and Maintenance (R&M) including equipment maintenance, repairs, fault corrections, etc.

Licensee has adopted method recommended by commission in 3rd Control period MYT order. Below is the methodology adopted by the licensee for projection of O&M expenses for 4th Control period:

a&b Employee expenses (EE) and Administrative and General (A&G) expenses

As per MYT order for 3rd Control period, commission has recommended all the licensees to project EE and A&G expense based on the norms linked to Number of Substations (SS), line length (Circuit KM), Number of consumers and Number of DTRs. Licensee has adopted the same methodology for projecting the employee expenses and A&G expenses for 4th Control period. The methodology for projecting employee expenses is explained below. Same methodology has been adopted for projecting A&G expenses:

(1) For each year, actual Employee expenses (net of capitalization) is allocated to Substations, Line length, DTRs and Consumers in the ratio of 49%:21%:10%:20%. The following ratios are calculated: Employee expense/ Substation, Employee expense/ circuit km of line length, Employee expense/ DTR, Employee expense/ Consumer.

Below table shows the historical data for Employee expenses, A&G expenses and Number of Substations (SS), line length (Circuit KM), Number of consumers and Number of DTRs.

Parameter	Unit	FY14	FY15	FY16	FY17	FY18
Employee Expenses (EE) – net of capitalisation	**Rs. Crs.**	483	972	790	772	803
A&G Expenses – net of capitalisation	**Rs. Crs.**	57	71	86	81	69
No. of Consumers	Nos.	5,055,580	5,107,208	5,351,042	5,590,733	5772499
Number of DTRs	Nos.	144,964	151,447	162,975	173,326	188287
Line Lengths	Kms	116,812	123,199	129,244	130,853	133605
Number of SS	Nos.	647	656	722	732	816

Below table shows the historical norms for the ratios:

Parameter	Unit	FY14	FY15	FY16	FY17	FY18
EE / Consumers	Rs./Nos	191	380	295	276	278
EE / DTR	Rs./Nos	3,329	6,416	4,848	4,454	4,264
EE / Line	Rs./Kms	8,676	16,562	12,837	12,390	12,620
EE /SS	Rs./Nos.	3,654,911	7,257,461	5,361,924	5,167,948	4,821,185
A&G Exp/ Consumers	Rs./Nos.	22	28	32	29	24
A&G Exp/DTR	Rs./Nos.	392	466	528	467	365
A&G Exp/line	Rs./Kms	1,022	1,203	1,398	1,299	1,079
A&G Exp/SS	Rs./Nos.	430,605	527,194	584,006	541,941	412,146

(2) To arrive at the average of these ratios, the Licensee has considered the data from FY 2013-14 onwards. Average of these ratios for the 5 years between FY2013-14 and FY2017-18 has been considered as the norms for FY2015-16. These norms for FY2015-16 are escalated for by using the escalation rate calculated based on the WPI and CPI index as shown below:

Escalation Rate: For the projections of the expenses, licensee has considered the escalation (inflation) rate as calculated from the WPI and CPI indexes in the 3rd Control period as shown below.

Inflation rate depends on the Consumer Price Index (CPI) for industrial workers and Wholesale Price Index (WPI). The below table lists the CPI (Industrial Worker) and WPI data from FY12 to FY18.

Particulars	FY12	FY13	FY14	FY15	FY16	FY17	FY18
WPI	100.0	106.9	112.5	113.9	109.7	111.6	114.9
CPI	194.8	215.2	236.0	250.8	265.0	275.9	284.4

Source: CPI - www.labourbureau.nic.in, WPI -www.eaindustry.nic.in (Office of the Economic Advisor website)

Basis the observed historical CPI and WPI numbers (CPI- Industrial Workers: 40% and WPI: 60%) and calculated the inflation factor based on the illustrative methodology suggested by CERC as shown below:

Year	WPI	CPI	Composite number	Rt= Yt/Y1	Ln (Rt)	Year - 1	Product
FY12	100	194.8	137.9				
FY13	106.9	215.2	150.2	1.09	0.09	1	0.09
FY14	112.5	236.0	161.9	1.17	0.16	2	0.32
FY15	113.9	250.8	168.7	1.22	0.20	3	0.60
FY16	109.7	265.0	171.8	1.25	0.22	4	0.88
FY17	111.6	275.9	177.3	1.29	0.25	5	1.26
FY18	114.9	284.4	182.7	1.32	0.28	6	1.69
A= Sum of Product column			4.83				
B= 6A			28.98				
C= n(n-1)(2n-1); n= number of years of data			546.00				
D=B/C			0.05				
g= exp (D)-1			0.05				
Escalation rate= g*100			**5.45**				

The inflation factor is observed to be 5.45% during 3rd Control period. However, for projections of the expenses, licensee has considered 95% of this escalation rate which is 5.16%.

Below are the projected norms for FY2015-16 onwards.

Parameter	FY16	FY17	FY18
EE / Consumers	284	299	314
EE / DTR	4,662	4,903	5,156
EE / Line	12,617	13,268	13,953
EE /SS	5,252,686	5,523,724	5,808,748
A&G Exp/Consumers	27	28	30
A&G Exp/DTR	444	466	491

Parameter	FY16	FY17	FY18
A&G Exp/line	1,200	1,262	1,327
A&G Exp/SS	499,179	524,936	552,023

Parameter	FY19	FY20	FY21	FY22	FY23	FY24
EE / Consumers	331	348	366	384	404	425
EE / DTR	5,422	5,701	5,996	6,305	6,630	6,973
EE / Line	14,672	15,430	16,226	17,063	17,943	18,869
EE /SS	6,108,480	6,423,677	6,755,139	7,103,704	7,470,256	7,855,721
A&G Exp/Consumers	31	33	35	37	38	40
A&G Exp/DTR	516	542	570	600	631	663
A&G Exp/line	1,396	1,468	1,544	1,623	1,707	1,795
A&G Exp/SS	580,507	610,461	641,961	675,086	709,921	746,553

(3) The projected ratios based on the escalation rates are multiplied by the projected Number of Substations (SS), line length (Circuit KM), Number of consumers and Number of DTRs in order to arrive at the employee expenses and A&G expenses for the respective years of 4th Control period.

Below table shows the projected Number of Substations (SS), line length (Circuit KM), Number of consumers and Number of DTRs and the projected employee expense and A&G expenses:

Parameter	Unit	FY19 (RE)	FY20	FY21	FY22	FY23	FY24
No. of Consumers	Nos.	5,983,154	6,202,996	6,361,401	6,571,725	6,789,502	7,015,013
Number of DTRs	Nos.	195,657	202,167	209,977	218,647	228,427	239,077
Line Lengths	Kms	140,116	146,091	152,500	159,600	167,549	176,239
Number of SS	Nos.	945	1,123	1,246	1,381	1,533	1,698
Employee Expenses (net)	Rs. Cr.	1,157	1,278	1,448	1,644	1,872	2,131
A&G Expenses (net)	Rs. Cr.	103	121	138	156	178	203

c. Repair and Maintenance (R&M) Expenses –In the 3rd Control Period Hon'ble APERC has approved Repairs & Maintenance (R&M) cost as 2.05% of the opening balance of Gross Fixed Assets (GFA) pertaining to the year of consideration. The distribution licenses are contemplating to step up the activities on periodical and preventive maintenance for keeping the distribution system in a tidy condition. DISCOMs are

monitoring the outages with internationally renowned indices such as SAIFI & SAIDI etc. To meet such standards, the system downtimes are to be kept at very low and optimum levels. The present system is to be checked thoroughly and strict maintenance schedules and procedures are to be planned & implemented. Further the Hon'ble APERC has been providing Rs 5 crores per year for enhancing the Safety provisions. Since these provisions are network related, these special provisions on safety are proposed to be accounted for in Network ARR under R&M expenditure with effect from FY 2019-20. Further, there is an increase of around 50% to the wages to the outsourcing employees deployed in Substations for carrying out operation & maintenance services. In view of the above, it is necessitated for enhancement of the R&M norm from the existing level of 2.05% to 2.50% for the 4th Control Period.

Below table shows the projections summary of the R&M expenses:

Name of the Parameter	FY19	FY20	FY21	FY22	FY23	FY24
Average R&M as % of Opening GFA	2.5%	2.5%	2.5%	2.5%	2.5%	2.5%
Opening GFA	6,430	7,071	8,090	10,083	12,071	13,482
R&M expenses	**161**	**177**	**202**	**252**	**302**	**337**

O&M projections summary for the Control period and break-up are shown in the table below.

Parameter	Unit	FY19 (RE)	FY20	FY21	FY22	FY23	FY24
Employee Cost (net)	Rs. Crs	1,157	1,278	1,448	1,644	1,872	2,131
A&G Cost (net)	Rs. Crs	103	121	138	156	178	203
R&M Cost	Rs. Crs	161	177	202	252	302	337
Total O&M Expenses	**Rs. Crs**	**1,421**	**1,576**	**1,787**	**2,052**	**2,351**	**2,671**

7.5 Depreciation

The depreciation every year for the particular asset class has been calculated as per below formula considering the Depreciation rates for respective asset class of asset base and also Fully Depreciated Assets during the control period.

Depreciation for the year = (Opening balance of the gross fixed assets for the year – Fully Depreciated Assets till previous year) * Rate of depreciation

The total depreciation for the year is calculated by adding the yearly depreciation of each asset class.

The Depreciation rates as per Ministry of Power guidelines have been assumed to arrive at next 5 years depreciation which is shown below:

Asset Class	Rate of Depreciation
Buildings and Other Civil Works	3.02%
Battery Chargers	33.40%
Material Handling Equipment	7.84%
Meters / Meter Equipment	12.77%
Office Equipment and Air Conditioners	12.77%
Plant & Machinery and Lines, Cables & Network	7.84%
Capacitor Banks	5.27%
Furniture & Fixtures	12.77%
Vehicle – Car / Jeep / Scooter / Motor Cycle/ Lorry / Truck	33.40%
Computers and IT Equipment	12.77%
Intangible assets (Software, Goodwill etc.)	10.00%

The Fully depreciated assets till the year have been deducted from the opening balance of the next year to calculate the depreciation. Depreciation computation after considering the Fully Depreciated Assets (FDA) balances is tabulated below:

Particulars (Rs. Cr.)	FY19 (RE)	FY20	FY21	FY22	FY23	FY24
Opening Balance of assets	6,430	7,071	8,090	10,083	12,071	13,482
Asset Additions during the Year	641	1,018	1,993	1,988	1,411	1,587
Fully Depreciated assets during the year	301	329	276	364	243	255
Depreciation During the Year	371	397	449	582	705	796

7.6 Consumer Contribution and Grants

The consumer contribution additions and Grants has been estimated based on the past trend and new consumer additions in the next 5 years of the control period.

Below table provides the projections of the Consumer Contribution in 4th Control period.

Table 1: Consumer Contribution Details

Particulars	FY19	FY20	FY21	FY22	FY23	FY24
Opening Balance	1,411	1,635	1,709	1,817	1,927	2,064
Additions during the year	398	210	252	263	300	338
Deductions during the year	174	136	144	153	163	175
Closing Balance	**1,635**	**1,709**	**1,817**	**1,927**	**2,064**	**2,226**

Below table provides the projections of the Grants in 4th Control period.

Table 2: Gramts Details

Particulars	FY19	FY20	FY21	FY22	FY23	FY24
Opening Balance	431	455	419	387	356	328
Additions during the year	60	0	0	0	0	0
Deductions during the year	36	36	33	30	28	26
Closing Balance	**455**	**419**	**387**	**356**	**328**	**303**

7.7 Regulated Rate Base

The Hon'ble Commission has outlined principles for computation of Regulated Rate Base (RRB) in Regulation 4 of 2005.

Calculation of RRB

The honourable commission has proposed a computation methodology (in the excel spreadsheet) for the RRB calculation for the year, which is as follows:

"RRB = (OCFA – AD– CC) + ΔRAB+WC where,

- **OCFA:** Original Cost of Fixed Assets at the beginning of the Year available for use and necessary for the purpose of the licensed business.
- **AD:** Amounts written off or set aside on account of depreciation of fixed assets pertaining to the regulated business at the beginning of the Year.
- **CC:** Total contributions made by the users towards the cost of construction of distribution/service lines by the Licensee and also include the capital grants/subsidies received for this purpose at the beginning of the year.
- **ΔRAB:** Change in the Rate Base in the year. This component would be the average of the value at the beginning and end of the year as the asset creation is spread across a year and is arrived at as follows:

  ΔRAB = (Inv – D – CC)/2

  - Inv: Investments projected to be capitalised during the year of the Control Period and approved.
  - D: Amount set aside or written off on account of Depreciation of fixed assets for the year of the Control Period.
  - CC: User Contributions pertaining to the ΔRAB and capital grants/subsidies received during year of the Control Period for construction of service lines or creation of fixed assets.

Based on the above computation methodology, RRB has been calculated as shown below table. The Original Cost of Fixed Assets (OCFA), Accumulated Depreciation and Total

Consumer Contribution calculated for Base Year and 4th Control period i.e., from 2018-19 to 2023-24 are as follows:

Particulars	FY19 (RE)	FY20	FY21	FY22	FY23	FY24
Assets	**7,071**	**8,090**	**10,083**	**12,071**	**13,482**	**15,068**
-OCFA Opening Balance	6,430	7,071	8,090	10,083	12,071	13,482
-Additions to OCFA	641	1,018	1,993	1,988	1,411	1,587
Acc. Depreciation Closing Balance	**3,421**	**3,818**	**4,267**	**4,849**	**5,554**	**6,350**
-Acc. Depreciation Opening Balance	3,050	3,421	3,818	4,267	4,849	5,554
-Depreciation for the year	371	397	449	582	705	796
Con. Contributions & Grants Closing balance	**2,090**	**2,128**	**2,203**	**2,283**	**2,392**	**2,529**
-Con. Contributions & Grants Opening Balance	1,843	2,090	2,128	2,203	2,283	2,392
-Additions to Cons. Contributions & Grants	248	38	75	79	109	137
Working Capital	138	153	173	201	232	263
Change in Rate Base	**11**	**292**	**734**	**663**	**298**	**327**
Regulated Rate Base	**1,687**	**2,005**	**3,052**	**4,477**	**5,470**	**6,126**

7.8 Weighted Average Cost of Capital (WACC)

The Regulation prescribes that the licensees will be compensated for the financing costs through Return on Capital Employed (ROCE) principles. This principle is aimed to provide the licensee with the return on debt as well as return on equity at a normative level. The licensee has computed the ROCE as provided in the Clause 15 of the Regulation which specifies that the ROCE be computed by multiplying the Regulated Rate Base (RRB) by the Weighted Average Cost of Capital (WACC).

The Regulation specifies the following methodology for computation of ROCE:

Return on Capital Employed (RoCE) for the RRB for the year 'i' shall be computed in the following manner:

$RoCE_i = WACC * RRB_i$

Where RRBi is the Regulated Rate Base for the year 1 and WACC is the Weighted Average Cost of Capital. The detailed computation of RRB is explained in Section 2.5 above. With respect to the WACC, the Regulation specifies the formula as follows:

$$WACC_{RRB} = \left[\frac{D/E}{1+D/E}\right] r_d + \left[\frac{1}{1+D/E}\right] r_e$$

Where,

D/E is the Debt to Equity Ratio – Licensee is proposing a normative Debt: Equity ratio of 75:25

- r_d is the Cost of Debt – Licensee has considered the cost of debt as the weighted average of the debt rates for the ongoing loans and projected loans.

- r_e is the Return on Equity – It has been the prevailing regulatory practice to consider 14% as the Return on Equity (ROE) in the ARR of Network business of AP Power Utilities. The APDISCOMs request the Hon'ble APERC to continue the same practice for the 4th Control period also, in view of the prevailing equity market conditions.

Based on the RRB explained earlier, the WACC and the ROCE for the 4th Control Period is as follows:

Particulars	FY19	FY20	FY21	FY22	FY23	FY24
Capital Structure						
Debt Percent	75.0%	75.0%	75.0%	75.0%	75.0%	75.0%
Equity percent	25.0%	25.0%	25.0%	25.0%	25.0%	25.0%
Cost of Funds						
Cost of Debt percent	10.6%	10.8%	11.3%	11.5%	11.6%	11.7%
Return on Equity percent	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
WACC	**11.5%**	**11.6%**	**12.0%**	**12.1%**	**12.2%**	**12.2%**

7.9 Return on Capital Employed

The licensee has arrived at RoCE for all five years of the control period as a product of Regulated Rate Base (RRB) and Weighted Average Cost of Capital (WACC) which is as follows:

Particulars	FY19 (RE)	FY20	FY21	FY22	FY23	FY24
Regulated Rate Base	1,687	2,005	3,052	4,477	5,470	6,126
WACC	11.5%	11.6%	12.0%	12.1%	12.2%	12.2%
Return on Capital Employed	**193**	**233**	**366**	**542**	**667**	**750**

7.10 Taxes on Income

The licensee projects 20% tax (Minimum Alternate Tax) on Return on Equity during the current fiscal and during ensuing control period. The details are as follows:

	FY19 (RE)	FY20	FY21	FY22	FY23	FY24
RRB	1,687	2,005	3,052	4,477	5,470	6,126
25% of Regulatory Rate Base	422	501	763	1,119	1,367	1,531
ROE %	14.0%	14.0%	14.0%	14.0%	14.0%	14.0%
Expected Profit @ 14% on 25% of RRB	59	70	107	157	191	214
Tax on Income @ 20%	**15**	**18**	**27**	**39**	**48**	**54**

8 Aggregate Revenue Requirement

Following table shows the projected revenue requirement for the distribution licensee during the 4th Control Period.

Particulars	FY19 (RE)	FY20	FY21	FY22	FY23	FY24
O&M Charges (Net)	1,421	1,576	1,787	2,052	2,351	2,671
Depreciation	371	397	449	582	705	796
Advance Against Depreciation	0	0	0	0	0	0
Taxes on Income	15	18	27	39	48	54
Other Expenditure	15	15	16	16	17	17
Special Appropriations	0	0	0	0	0	0
Total Expenditure	1,822	2,005	2,279	2,689	3,121	3,538
Less: IDC and expenses capitalized*	33	71	140	134	75	52
Less: O&M expenses capitalized	0	0	0	0	0	0
Net Expenditure	1,789	1,934	2,139	2,555	3,046	3,485
Add Return on Capital Employed	193	233	366	542	667	750
Total Distribution ARR	1,983	2,167	2,505	3,097	3,713	4,236
Less: Non-Tariff Income (NTI), Wheeling Revenue from Third Party/Open Access (if any)	223	186	192	199	208	219
Revenue Requirement, (Net transferred to Retail Supply Business)	**1,759**	**1,981**	**2,313**	**2,898**	**3,505**	**4,016**

9 Financial Statements of APEPDCL for FY 2017-18 to FY 2023-24

The profit and loss account for Distribution business of APEPDCL and the balance sheet from FY2018-19 to FY2023-24 are presented in the table below. The financial statements are taken as per the Multi-year Tariff Petition filed with Hon'ble Commission on 30th Nov 2018.

Profit and Loss Statement:

Sch. No.	Schedule Note	FY18	FY19	FY20	FY21	FY22	FY23	FY24
	INCOME							
1	Revenue from sale of power	9,119	9,908	11,326	12,365	13,501	14,761	16,163
	Less: State Electricity Duty	0	0	0	0	0	0	0
		9,119	**9,908**	**11,326**	**12,365**	**13,501**	**14,761**	**16,163**
	Revenue from sale of Solar Power							
4	Revenue Subsidies and grants	512	1,626	2,008	1,880	2,392	2,958	3,457
5	Other Income	1,002	579	559	576	595	615	639
	TOTAL INCOME	**10,633**	**12,112**	**13,892**	**14,821**	**16,488**	**18,335**	**20,259**
	EXPENDITURE							
6	Purchase of Power	8,794	9,940	11,401	11,963	13,064	14,282	15,634
7	Generation of Power							
8	Repairs & Maintenance (Net of Capitalizati	125	161	177	202	252	302	337
9	Employee Costs (Net of Capitalization)	803	1,157	1,278	1,448	1,644	1,872	2,131
10	Administration & General Expenses (Net o	69	103	121	138	156	178	203
11	Depreciation and Related Debits (Net)	357	371	397	449	582	705	796
12	Interest and Finance charges	353	207	367	488	585	684	791
	Other Expenses	128	132	136	140	144	148	153
	SUB TOTAL	**10,628**	**12,071**	**13,876**	**14,827**	**16,426**	**18,171**	**20,043**
	LESS: EXPENSES CAPITALISED							
13	Interest and Finance charges capitalised	0	33	71	140	134	75	52
14	Other expenses capitalised	0	0	0	0	0	0	0
	Sub-Total (13+14)	**0**	**33**	**71**	**140**	**134**	**75**	**52**
15	Other Debits							
16	Extra-ordinary items	0	0	0	0	0	0	0
	Sub Total (15+16)	**0**	**0**	**0**	**0**	**0**	**0**	**0**
	Total Expenditure(6 TO 12 -13-14+15-	**10,628**	**12,039**	**13,805**	**14,687**	**16,292**	**18,096**	**19,991**
	PROFIT/(LOSS) BEFORE TAX	5.1	74	88	134	196	239	268
17	Provision for Income tax	2.20	15	18	27	39	48	54
	PROFIT/(LOSS) AFTER TAX	3	59	70	107	157	191	214
18	Net Prior Period Credit /(Charges)	7.56	0	0	0	0	0	0
	SURPLUS/(DEFICIT)	**10.46**	**59**	**70**	**107**	**157**	**191**	**214**

Balance Sheet:

Particulars	FY18	FY19	FY20	FY21	FY22	FY23	FY24
Sources of Funds							
1. Shareholders' Funds							
a) Share Capital	121	121	121	121	121	121	121
b) Reserves and surplus	-3,223	-2,914	-2,807	-2,635	-2,418	-2,148	-1,839
2. Loan Funds							
a) Secured Loans	2,562	1,593	2,715	3,413	4,096	4,814	5,600
b) Other long term liablities	6,398	8,452	8,545	8,769	8,914	8,804	8,515
b) Long term provisions	470	494	519	544	572	600	630
Total	**6,329**	**7,746**	**9,093**	**10,213**	**11,285**	**12,191**	**13,028**
Application of Funds							
1. Fixed Assets							
a) Gross Block	4,055	7,071	8,090	10,083	12,071	13,482	15,068
b) Less: Accumulated Depreciation	674	3,421	3,818	4,267	4,849	5,554	6,350
c) Net Block	**3,381**	**3,650**	**4,272**	**5,816**	**7,222**	**7,928**	**8,719**
d) Capital Work-in-progress	399	1,359	1,935	1,181	551	643	731
Deferred tax asset	-2	-2	-2	-2	-2	-2	-2
Other Non-current assets	3,508	3,676	3,853	4,038	4,233	4,437	4,652
2. Investments	166	151	151	151	151	151	147
Long term loans and advances	73	75	77	80	82	85	87
3. Current Assets, Loans & Advances							
a) Inventories	205	189	186	143	163	190	216
b) Trade Receivables	1,684	1,856	2,045	2,253	2,481	2,733	3,010
c) Other Receivables	1,445	1,572	1,691	1,778	1,874	1,980	2,098
d) Cash & Bank balances	286	300	315	331	347	364	383
e) Loans & Advances	4.62	4.85	5.09	5.35	5.62	5.90	6.19
	3,624	**3,921**	**4,241**	**4,510**	**4,871**	**5,274**	**5,712**
Less:Current Liabilities and Provisions							
a) Short term Borrowings	544	3,091	3,091	3,049	3,082	3,291	3,664
b) Trade Payables	2,860	909	1,062	1,073	1,137	1,246	1,366
c) Other current liabilities	1,252	918	1,110	1,262	1,423	1,599	1,794
d) Short term Provisions	162	167	172	177	182	188	193
	4,819	**5,085**	**5,435**	**5,561**	**5,824**	**6,324**	**7,018**
Net Current Assets	**-1,195**	**-1,164**	**-1,194**	**-1,051**	**-953**	**-1,050**	**-1,306**
Total	**6,329**	**7,746**	**9,093**	**10,213**	**11,285**	**12,191**	**13,028**

CHIEF GENERAL MANAGER
PPA, RA & QC
A.P.E.P.D.C. LTD.
VISAKHAPATNAM-13